CLAIMS

What is claimed is:

1. A method for providing access to data in a programmable logic device (PLD), comprising:

maintaining a hierarchy of directories and files in a virtual file system that is registered with an operating system, wherein the directories and files are associated with resources of a PLD;

in response to program calls to file system routines that reference files associated with resources of the PLD,

invoking the virtual file system; and

accessing state information in resources of the PLD by the virtual file system.

2. The method of claim 1, wherein the resources include configurable logic resources.

3. The method of claim 2, wherein the resources include storage resources.

4. The method of claim 1, further comprising reading configuration data from a set of resources of the PLD in response to a call to a first file system routine that references a file with which the set of resources is associated.

5. The method of claim 4, further comprising writing configuration data to a set of resources of the PLD in response to a call to a second file system routine that references a file with which the set of resources is associated.

6. The method of claim 1, wherein the hierarchy of directories and files includes a directory with a plurality

of region files, each region file associated with resources within an area of the PLD associated with the region file.

7. The method of claim 1, wherein the hierarchy of directories and files includes an application directory that includes a hierarchy of application sub-directories and application files, wherein each application subdirectory is associated with a subsystem implemented on the PLD, and each application file under an application sub-directory represents resources associated with the subsystem of the application sub-directory.

8. The method of claim 5, further comprising:

associating access permission indicators with selected ones of the directories and files;

granting read access to configuration data from a set of configurable resources associated with a file in response to a first state of an access permission indicator associated with the file; and

denying read access to configuration data from a set of resources associated with a file in response to a second state of the access permission indicator associated with the file.

9. The method of claim 8, further comprising:

granting write access to configuration data from a set of configurable resources associated with a file in response to a third state of an access permission indicator associated with the file; and

denying write access to configuration data from a set of resources associated with a file in response to a fourth state of the access permission indicator associated with the file.

10. The method of claim 1, wherein the hierarchy of directories and files includes a directory with an executable

file, the executable file configured to access state information of the PLD, and the method further comprising:

associating access permission indicators with selected ones of the directories and files;

granting execution access to an executable file in response to a first state of an access permission indicator associated with the executable file; and

denying execution access to an executable file in response to a second state of the access permission indicator associated with the executable file.

11. The method of claim 1, wherein the hierarchy of directories and files includes a directory with an executable file, the executable file configured with instructions for interpretation by the virtual file system and instructing access to state data of the PLD, and the method further comprising, in response to a request for execution of the executable file, instructing the virtual file system to interpret the instructions of the executable file.

12. The method of claim 1, wherein the hierarchy of directories and files includes a directory with at least one executable file, the executable file configured with one or more control codes for transferring control to the virtual file system, and the method further comprising, in response to a request for execution of the executable file, transferring control to the virtual file system.

13. The method of claim 5, wherein the PLD is coupled to a node via a network, further comprising:

exporting information describing the hierarchy of directories and files to the node; and

providing network access to the first and second functions of the virtual file system.

14. The method of claim 5, further comprising disabling a clock signal input to the PLD in response to a call to a third virtual file system function.

15. The method of claim 14, further comprising enabling a clock signal input to the PLD in response to a call to a fourth virtual file system function.

16. The method of claim 1, wherein the hierarchy of directories and files includes a directory with a plurality of region directories and each region directory includes a configuration file and a state file, each configuration file associated with configurable logic resources within an area of the PLD associated with the region directory, and each state file associated with storage resources within the area of the PLD associated with the region directory.

17. The method of claim 1, further comprising:

connecting configurable logic resources in a first area of the PLD to configurable logic resources in a second area of the PLD by reconfiguration of routing resources in the PLD in response to a call by the application program to a file system routine that specifies a first file associated with the first area of the PLD, a second file associated with the second area of the PLD, and a pipe.

18. The method of claim 1, further comprising:

implementing a processor on a PLD; and

hosting the operating system on the processor.

19. The method of claim 1, further comprising:

interfacing the virtual file system with a configuration controller implemented on the PLD; and

accessing PLD resources via the configuration controller in response to access requests from the virtual file system.

20. The method of claim 19, wherein the interfacing step comprises interfacing the virtual file system with a configuration controller via a network.

21. The method of claim 1, further comprising

writing a configuration file to a sym file handle provided by the virtual file system, wherein the configuration file specifies the hierarchy of directories and files; and

in response to writing of the configuration file, establishing the hierarchy of directories and files by the virtual file system.

22. A method for providing access to data in a programmable logic device (PLD), comprising:

maintaining a hierarchy of directories and files in a virtual file system that is registered with an operating system, wherein the directories and files are associated with resources of a PLD;

in response to program calls to file system routines that reference files associated with resources of the PLD,

invoking the virtual file system; and

accessing by the virtual file system state information in a bitstream file containing state information of resources of the PLD.

23. An apparatus for providing access to data in a programmable logic device (PLD), comprising:

means for maintaining a hierarchy of directories and files in a virtual file system that is registered with an operating system, wherein the directories and files are associated with resources of a PLD; and

means, responsive to program calls to file system routines that reference files associated with resources of the PLD, for invoking the virtual file system and accessing

state information in resources of the PLD by the virtual file system.

24. An apparatus for providing access to data in a programmable logic device (PLD), comprising:

means for maintaining a hierarchy of directories and files in a virtual file system that is registered with an operating system, wherein the directories and files are associated with resources of a PLD; and

means, responsive to program calls to file system routines that reference files associated with resources of the PLD, for invoking the virtual file system and accessing by the virtual file system state information in a bitstream file containing state information of resources of the PLD.

25. An article of manufacture, comprising:

a processor-readable medium configured with instructions for causing a processor to perform the steps including,

maintaining a hierarchy of directories and files in a virtual file system that is registered with an operating system, wherein the directories and files are associated with resources of a PLD;

in response to program calls to file system routines that reference files associated with resources of the PLD,

invoking the virtual file system; and

accessing state information in resources of the PLD by the virtual file system.

26. A system for providing access to configurable logic resources on an integrated circuit (IC), comprising:

a processor hosting an operating system, the operating system accessing a hierarchy of directories and files in a virtual file system, wherein the directories and files are associated with the configurable logic resources; and

code stored in a computer readable memory, the code having program calls to file system routines that reference

files associated with the configurable logic resources such that the virtual file system is invoked and state information in the configurable logic resources is accessed by the virtual file system.

27. The system of claim 26 wherein the IC comprises an FPGA.

28. The system of claim 26 wherein the processor is an embedded processor on the IC.

29. The system of claim 26 wherein the processor is a processor external to the IC.

30. The method of claim 1, wherein the hierarchy of directories and files includes a directory with a plurality of region files, each region file associated with unused resources of the PLD.